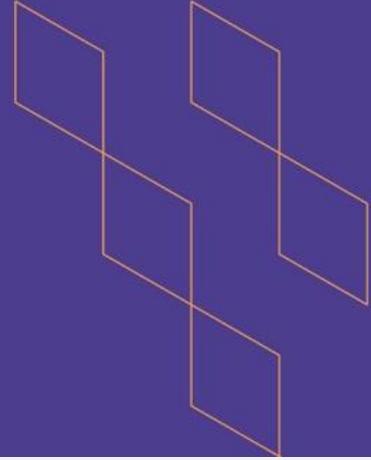T-104
2022

# Course Specification

T-104
2022

# Course Specification

| Course Title:  digital circuits |
|---|
| Course Code:   252 CIS- 4 |
| Program: Technical support |
| Department:   Computer Department |
| College:   Applied College |
| Institution:   Najran University |
| Version:   **T -104 2022** |
| Last Revision Date:   **28-8-2023** |

# Table of Contents:

# A. General information about the course:

| Course Identification | |
|---|---|
| 1. Credit hours: | 4 hours |

2. Course type

| a. | University ☐ | College ☐ | Department ☒ | Track ☐ | Others ☐ |
|---|---|---|---|---|---|
| b. | Required ☒ | Elective ☐ | | | |

3. Level/year at which this course is offered: 2<sup>nd</sup> year , level 3

**4. Course general Description**
This course is concerned with training on digital electrical circuits and how to design and analyze them. Where. is trained Numerical systems and conversion between them, building equations using Boolean algebra, and simplifying these equations to facilitate their application.
The trainee is also trained on the outputs of complex digital circuits, building complex circuits, and analyzing and designing digital circuits It can be used in specific applications.

**5. Pre-requirements for this course (if any):**
No

**6. Co- requirements for this course (if any):**
No

**7. Course Main Objective(s)**
This course aims to introduce the student to digital circuits and how to build, analyze and use them in specific applications, in addition to introducing the student to voltage, current, resistance, Ohm's law, energy and power.

## 1. Teaching mode (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1. | Traditional classroom | 4 hours per week | 100% |
| 2. | E-learning | | |
| 3. | Hybrid <br> • Traditional classroom <br> • E-learning | | |
| 4. | Distance learning | | |

## 2. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|----|----------|---------------|
| 1. | Lectures | 45 |
| 2. | Laboratory/Studio | 30 |
| 3. | Field | |
| 4. | Tutorial | |
| 5. | Others (specify) | |
| | Total | 75 |

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|------|--------------------------|-----------------------------------|---------------------|--------------------|
| 1.0 | Knowledge and understanding | | | |
| 1.1 | Knows number systems and how they are used. | K2 | Lecture | Exams +H.W +C.W |
| 1.2 | Calculating transformations between numerical Systems | K3 | interactive lectures + Tutorial | Exams +H.W +C.W |
| 1.3 | Algebra | | interactive lectures + Tutorial | Exams +H.W +C.W |
| 2.0 | Skills | | | |
| 2.1 | Describe all kinds of circles | S3 | interactive lectures + Lab | Exams +H.W +C.W |
| 2.2 | Differentiate between the functions of the types of gates | S2 | interactive lectures + Lab | Exams +H.W +C.W |
| 2.3 | Detects errors in digital circuits | S4 | interactive lectures + Lab | Exams +H.W +C.W |
| 2.4 | | | | |
| 2.5 | | | | |
| 2.6 | | | | |
| 3.0 | Values, autonomy, and responsibility | | | |
| 3.1 | Follows the scientific method and modern technologies in the field of technical support | V1 | Create groups | Observation |
| 3.2 | | | Lab | Observation |
| 3.3 | | | Lab | Observation |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1. | - VOLTAGE, CURRENT,AND RESISTANCE<br>- OHM'S LAW, ENERGY, AND POWER | 10 |
| 2. | Number systems and complements<br>-Different counting systems and conversion from one system to another (Decimal, binary, octal, hexadecimal)<br>- Perform simple arithmetic operations using different number systems. | 10 |
| 3. | Design simple logic circuits<br>-Logical Gates.<br>-Boolean equations and how to represent them using logic gates and truth tables | 10 |
| 4. | Simplify simple logic circuits<br>-Boolean algebra rules<br>-De Morgen's theory<br>-Karnaugh maps | 10 |
| 5. | combinational logic circuits<br>- Binary Adder & Binary Subtract<br>- Encoder & Decoder<br>- Multiplexer & Demultiplexer<br>- comparator | 10 |
| 6. | Capable of displacement using different types of flip-Flops<br>- R-S Flip-flop<br>- Clocked R-S Flip-flop<br>- D Flip-flop<br>- J-K Flip-flop Clocked | 10 |
| 7. | Synchronous Logic Circuits<br>- Synchronous Counter<br>- Register | 15 |
| Total | | 75 |

## D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|---|---|---|---|
| 1. | Middle-Term Exam | 8 | 30% |
| 2. | Assignments | 10 | 10% |
| 3. | Practical Exam | 15 | 20% |
| 4. | Final exam | 17 | 50% |

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

## E. Learning Resources and Facilities

### 1. References and Learning Resources

| | |
|---|---|
| Essential References | M. Morris Mano, Michael D. Ciletti, Digital Design, 5th Edition |
| Supportive References | Thomas L. Floyd , Digital Fundamentals, Eleventh Edition, Prentice.  2000 |
| Electronic Materials | Https://www.youtube.com/watch?v=YysQEuKQ5Hc&list=PLww54WQ2wa5ob q6IbRbliql8oHaTUp3T_ |
| Other Learning Materials | |

### 2. Required Facilities and equipment

| Items | Resources |
|---|---|
| facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | Lecture rooms should be large enough to accommodate the number of registered students |
| Technology equipment (projector, smart board, software) | Black Board/Data Show |
| Other equipment (depending on the nature of the specialty) | |

## F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| Effectiveness of teaching | *Student* | Questionnaire |
| Effectiveness of students assessment | Staff committee | Questionnaire and exam audit |
| Quality of learning resources | Faculty Administration | Review and check the results |
| The extent to which CLOs have been achieved | Quality management in the department | A review of the measurement of learning outcomes |
| Other | | |

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

## G. Specification Approval Data

| COUNCIL /COMMITTEE | |
|---|---|
| REFERENCE NO. | |
| DATE | |